


Signal enhancement in spark-assisted laser-induced breakdown spectroscopy for discrimination of glioblastoma and oligodendroglioma lesions: supplement

PARISA MOHAMMADIMATIN,¹ PARVIZ PARVIN,^{1,*} AMIR JAFARGHOLI,² AMIN JAHANBAKHSI,³ FATEMEH AHMADINOURI,¹  ALIREZA TABIBKHOEI,⁴ OMID HEIDARI,¹ AND SAREH SALARINEJAD⁵

¹Department of Physics and Energy Engineering, Amirkabir University of Technology, P.O. Box 15875-4413, Tehran, Iran

²Department of Electronic and Electrical Engineering, University College London (UCL), United Kingdom

³Stem Cell and Regenerative Medicine Research Center, Iran University of Medical Sciences, P.O. Box, 1997667665, Tehran, Iran

⁴Skull Base Research Center, Department of Neurosurgery, Iran University of Medical Sciences, P.O. Box, 1997667665, Tehran, Iran

⁵Shohada-e-Tajrish Hospital, Department of Pathology, Faculty of Medicine, Shahid Beheshti University of Medical Sciences, P.O. box 1985717443, Tehran, Iran

*parvin@aut.ac.ir

This supplement published with Optica Publishing Group on 17 October 2023 by The Authors under the terms of the [Creative Commons Attribution 4.0 License](#) in the format provided by the authors and unedited. Further distribution of this work must maintain attribution to the author(s) and the published article's title, journal citation, and DOI.

Supplement DOI: <https://doi.org/10.6084/m9.figshare.24212112>

Parent Article DOI: <https://doi.org/10.1364/BOE.497234>

Supplementary

Fig. S1 illustrates the line scan in favor of typical CaII and MgII for GBM/infiltrate (a,b) and OG/infiltrate (c, d) respectively under SA-LIBS (5kV) experiment which is carried out alongside the corresponding pathological examination. A typical sample of 8 mm tumor alongside 2.5 mm infiltrate tissue surrounding is selected for linear scans using SA-LIBS. The border of tumor/infiltrate is not well defined, however, the signal intensity lucidly drops in favor of the infiltrated against the lesion (area).

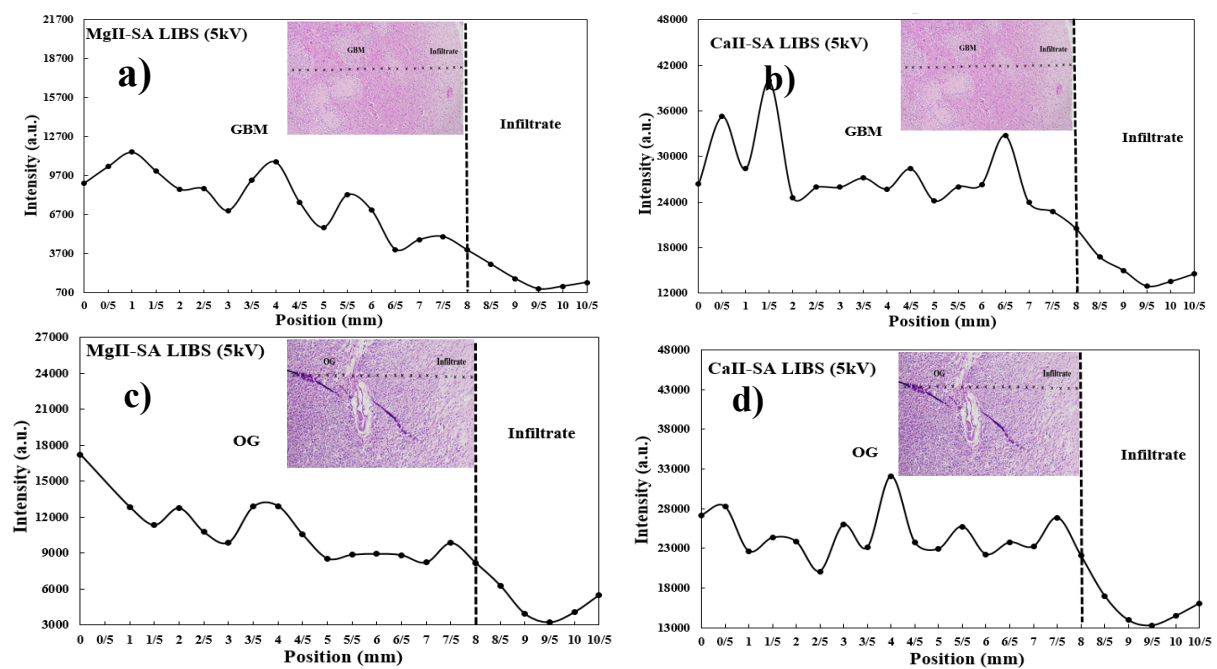


Fig. S1. Line scan (surface profile) of GBM and OG samples. (a) typical MgII profile in GBM/infiltrate, (b) typical CaII profile in GBM/infiltrate, (c) typical MgII profile in OG/infiltrate, (d) typical CaII profile in OG/infiltrate. Note that the signal lucidly drops in the infiltrating parts against the lesion area. The line scan follows 500 μm steps to delineate the elemental profile of the tissue section. Furthermore, the emission wavelengths of Mg II and Ca II are 279.52nm and 393.38 nm, respectively.

One of our goals is to utilize an inexpensive spectrometer for vast public applications. We have used a more accurate Avantes- Ava Spec (1 \AA -resolution) alongside Avantes- Ava Spec (4

\AA -resolution) over 200-300 nm to elucidate the validity of the results taken with the lower resolution. Despite phosphorus being hard to detect by LIBS, the corresponding characteristic line at 253.58 nm is visible using SA-LIBS. Fig. S.2 shows a typical OG spectra using two spectrometers of interest to identify the phosphorus line to double-check the elucidation of the P element.

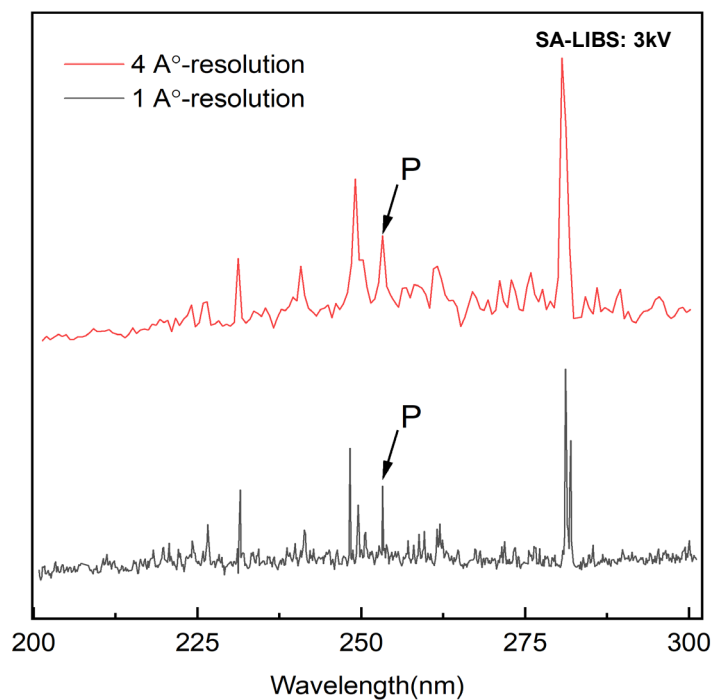


Fig. S. 2: Typical SA-LIB spectra (3kV) for OG sample using two spectrometers of interest.